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ABSTRACT

Marine mammals have not only fascinated and inspired human beings for thousands of years, but they also support a big business by providing flesh for sea-borne factories, sustaining Arctic lifestyles and traditions, and attracting tourists to ocean aquaria. While they are being harpooned, bludgeoned, shot, netted, and trained to jump through hoops, their habitats are being destroyed, their food supplies depleted, their waters polluted, and their breeding grounds invaded. Therefore, many species have or are becoming extinct. To prevent further extinctions, urgent action is needed. A common ground must be found that unites those for whom marine mammals are a source of pleasure and those for whom they are a business. This common ground must then be used as a basis for an effective global program of protection and management of marine mammal populations. This booklet attempts to identify that common ground, in order to promote quick and effective action to save the remaining marine mammals. It describes the wide variety of marine mammals, their characteristics and habitats, categories of fate (endangered, vulnerable, rare, and indeterminate), why certain species are becoming extinct, regulation of the whaling industry, uses (such as manatees clearing navigation channels of vegetation), economic factors, and other relevant topics. (JN)

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# MARINE MAMMALS

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UNITED NATIONS ENVIRONMENT PROGRAMME

# MARINE MAMMALS


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## WANTED DEAD OR ALIVE

Marine mammals have fascinated and inspired human beings for thousands of years. They are graceful, intelligent and mysterious creatures.

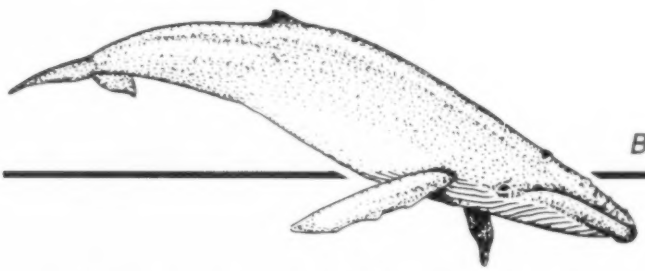
They are also big business. Their meat, fat, bone, skins and very brains are in demand. They provide flesh for sea-borne factories and oil for the gears of industry; they sustain Arctic lifestyles and traditions; they attract tourists to ocean aquaria and research grants for eager scientists.

So they are harpooned, bludgeoned, shot, netted, and trained to jump through hoops or carry weapons. In the meantime, their habitats are destroyed, their food supplies depleted, their waters polluted and their breeding grounds invaded.

It should therefore be no surprise that many marine mammal species are on the threshold of extinction; others have long since crossed over. As pressure on remaining populations increases, people who would continue to exploit these animals for sustenance or for profit, as well as those who would protect them for their inherent worth, have reason to be concerned.

The issues involved in marine mammal conservation are complex. Opinions differ, interest compete, emotions are aroused. But if we are to prevent further marine mammal extinctions, we must act urgently. We must find the common ground that unites those for whom marine mammals are a source of pleasure and those for whom they are a business. We must then use this as a basis for an effective global programme of protection and management of marine mammal populations.

This booklet attempts to identify this common ground, in order to promote quick and effective action to save our remaining marine mammals.

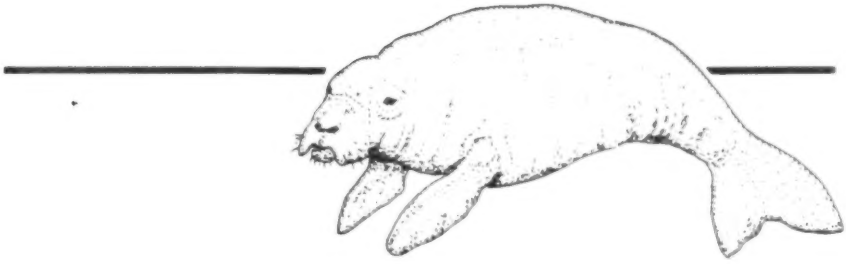


*Back to the sea*

Marine mammals — those mammals which spend all or much of their time in the sea and get their food them it — evolved from several groups of land animals who returned to the sea, at various times and probably for different reasons. The exact circumstances and chain of events are unknown.

The earliest groups which are still represented today include the modern whales and sirenians. They are thought to have originated about 60 million years ago from primitive hoofed mammals, making the whales distant cousins of modern cattle, and sirenians cousins of elephants and mammoths.

The cetaceans — modern toothed whales and dolphins (Odontocetes) and baleen whales (Mysticetes) — probably orginated about 40 million years ago. There are 10-12 living species of Mysticetes, and although we know of about 70 Odontocete species, there may be more. Some have moved to fresh water habitats, but for convenience are still considered marine mammals.



Most species of sirenians, or sea cows, have long been extinct. Today the group is represented by four species. A fifth (Steller's sea cow) was exterminated by hunters in the 18th century.

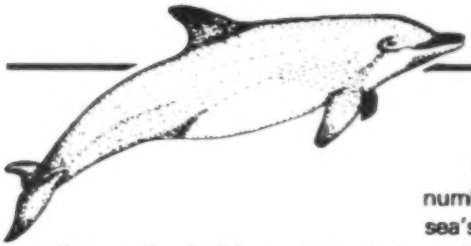
Most other marine mammals are related to today's cats, dogs and bears. These include the eared and earless seals — commonly known as "pinnipeds" — groups which probably diverged about 30 million years ago. They can be distinguished by the presence or absence of small external ears. Examples of eared seals (Family Otariidae) are the fur seals and sea lions; earless or "true" seals (Family Phocidae) include elephant seals, monk seals and many others. We know of more than 30 living species of pinnipeds.

A few other animals returned more recently to the sea, or are in the process of doing so. These include the Northern Pacific sea otter and the South American otter. A third example, the sea mink, was hunted to extinction in the 19th century.

The polar bear can be considered a marine mammal with good reason: it is an excellent swimmer and feeds on marine animals including ringed seals, fish and birds.

The return of mammals to the sea cannot be considered complete, for they have not developed a way to get oxygen from sea water. They must all surface to breathe. And pinnipeds, in spite of their superb adaptations to life in the water, must nevertheless come ashore to mate, give birth and nurture their infants. Phocid seals do not move about on land as easily as the fur seals, sea lions and walruses, which may indicate that they returned to the sea earlier than the other groups.

The sleek, bewhiskered sea otter *Enhydra lutris* was hunted almost to extinction for its lustrous fur in the 19th century.



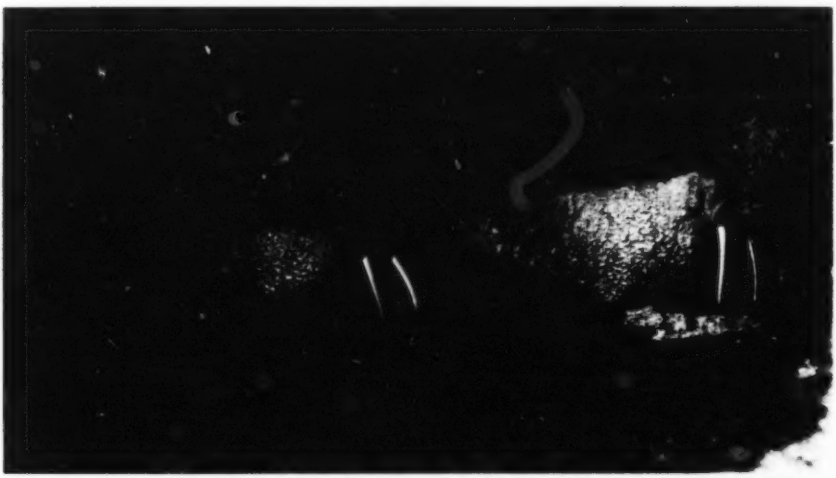


Marine mammals have evolved a number of ways of exploiting the sea's rich variety of food sources.

The gentle, herbivorous sirenians are limited to coastal areas where they consume many kinds of floating or rooted plants.

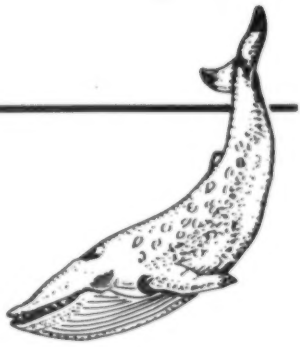
Carnivorous marine mammals have evolved two kinds of feeding systems. The baleen whales remove tiny crustaceans and fish from the water using a filtering system of comb-like plates projecting from the palate. Others feed on larger prey: otters and walruses prey on sedentary clams and sea urchins, whereas seals and toothed cetaceans pursue more mobile fish and squid. The sperm whales, largest of the toothed cetaceans, can dive to great depths in pursuit of giant squid; sperm whales have been tracked by sonar to depths of over five kilometers. Some dolphins, such as the killer whale *Orcinus orca* use their jaws as a sound receptor as well as for grabbing prey. Only three marine mammals — orcas, leopard seals and polar bears — are known to prey on fellow warm-blooded creatures.

The marvelous adaptations of marine mammals to aquatic life — the ways they move about, manipulate their food, find their prey, communicate with one another, dive, play, and learn — may explain why human beings respond so warmly to them. Their remarkable abilities, although not the subject of this booklet, account for the many ways they are used for human benefit today, as well as to some exciting possibilities for the future. Some conservationists and behavioural scientists believe strongly that marine mammals are more useful to humans alive than dead. Others say their "usefulness" is not the point: they are creatures whose abilities and brains rival our own, and should be cherished. Everyone agrees that they should be protected from further extinctions.



Walruses are represented by a single species, *Odobenus rosmarus*, although Atlantic and Pacific forms are generally recognized as different races. The tusks, which are longer in the Pacific walrus (shown here), are used primarily to dig up molluscs and to aid in locomotion.

## THE END OF THE LINE?



Species extinctions occur for many reasons, and are a normal feature of biological evolution. "Natural" causes include competition among species over resources such as food, light or space; predation; climatic changes such as global cooling and warming which may lead to physiological stress and habitat destruction; and even collision of the Earth with meteorites.

Whether current human activities, which are causing an unprecedented rate of species extinctions, can be considered "natural" is a matter of definition. We are animals, we compete for space, we feed on other species. But we are the only creature who kills for profit or pleasure, and who seems bent on destroying the web of life which sustains us.

Human self-interest, if nothing more, requires that we look carefully at the implications of our actions. The accelerating extinction of species at human hands is a particularly dramatic example of our mis-use of the Earth.

### *Categories of fate*

The International Union for Conservation of Nature and Natural Resources (IUCN) has developed a convenient system of categorizing species which we know to be threatened. The categories are defined in the IUCN Red Data Book as follows:

**Endangered:** those species in danger of extinction and whose survival is unlikely if causal factors continue operating.

**Vulnerable:** those species likely to move into the endangered category in the near future if causal factors continue operating.

**Rare:** those species with small world populations, not at present endangered or vulnerable, but at risk.

**Indeterminate:** those species known to be endangered, vulnerable or rare but for which there is not enough information to determine which of these three sub-categories is appropriate.

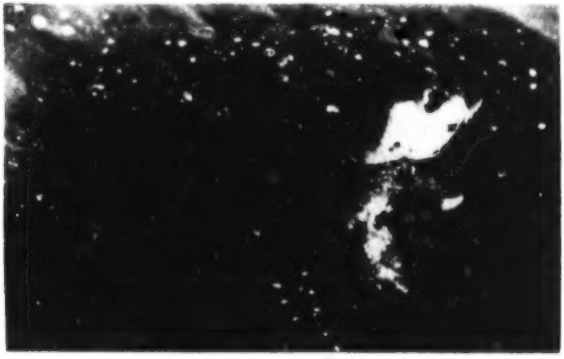
Of those species not considered threatened there are three other categories: out of danger; insufficiently known (only suspected to be threatened); and extinct.

Although the lists compiled according to this scheme are useful, they are far from exhaustive. Since the system includes only species whose status is known, it is of limited use. This is especially true for the several species of Odontocetes about which we know almost nothing.

But there are several marine mammals we do know about which are facing particular threat from human activities.

## *Last of the monks*

Of those endangered marine mammals of which we are aware, perhaps the Caribbean monk seal *Monachus tropicalis* (Family Phocidae) is in the most serious state. Once abundant along the coasts and islands of the Caribbean and Gulf of Mexico, the seals were heavily harvested for their oil during the 18th century. The rest seem to have been killed and driven from their habitats by fishermen, and the last authenticated sighting was of one individual off the Yucatan peninsula in 1962. An attempt to breed them in captivity failed, and there is only a slight chance that the species still survives in the wild.



A Mediterranean monk seal

A relative, the Mediterranean monk seal *Monachus monachus* is in only slightly better shape. Although they were once common thoughout the Mediterranean basin and along the northwest coast of Africa, today only a few hundred animals are thought to survive. Legal protection measures have done little to save them from persecution by fishermen, who consider them a nuisance, or from other human disturbances. Their scarcity, secretive habits and affinity for underwater caves make aerial and boat surveys impractical, so estimates are likely to be unreliable. It is certain, however, that their numbers have declined rapidly in recent decades, and increasing human activity in their breeding areas may well undermine all efforts to protect them.

Another cousin, the Hawaiian monk seal *Monachus schauinslandi,* is also on the endangered list. Although it may number fewer than 1,000 individuals, strict protection measures seem to have had some effect in partially preserving its breeding grounds. It was hunted nearly to extinction in the 19th century, and is still under pressure from human disturbances.

Some other phocid seals are considered threatened. The Saimaa seal *Phoca hispida saimensis* of Finland was once reduced to 40 individuals. The population has recovered to 200-300 after introduction of protective measures, but their habitats have been polluted and their fate is uncertain. Other sub-species of *Phoca hispida* appear to be abundant, however.

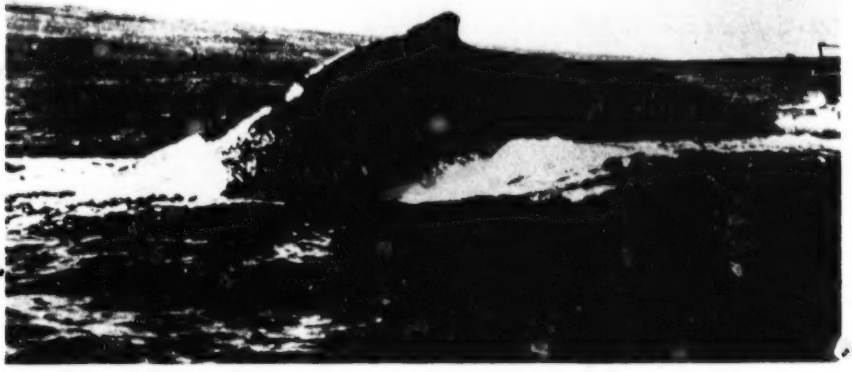
Although not threatened as a species, local populations of the harbour seal *Phoca vitulina* are thought to be threatened by habitat disturbance and pollution. The Wadden Sea (Netherlands) population showed a sharp decline in the mid-1970s for unknown reasons, and a sub-species, the Kurile harbour seal in the northern Pacific, has been reduced to about 5,000 individuals in spite of protection measures.

The great whales have become universal symbols of conservation, perhaps because so many of them have been hunted to near extinction. Some populations are so depleted that even the most strict protection measures may not save them. We do not even know how many whales there must be in a particular area of the ocean if they are to locate one another to mate. Noise from ships may aggravate the problem by interfering with the whales' acoustic system of communication.

Several great whales are considered endangered. These are the North Pacific grey whale *Eschrichtius robustus,* of which certain original stocks are possibly extinct; the blue whale *Balaenoptera musculus,* depleted to a total of some thousands during this century by whalers; the bowhead whale *Balaena mysticetus,* depleted by four centuries of whaling and still subject to "aboriginal whaling"; and the right whale *Eubalaena glacialis,* hunted to near-extinction between the 15th and 19th centuries and represented today by as few as 2,000 individuals.

One endangered whale of particular interest is the humpback whale *Megaptera novaeangliae.* Its near-shore breeding habits have made it popular with whale-watchers, and it still provides a staple supply of meat and oil for aboriginal subsistence fisheries in the Northwest Atlantic. Although we know more about humpbacks than most other whales, we still are far from having enough information to calculate the number which can presumably be harvested without reducing the stock.

Humpback populations have been so seriously depleted in this century that they may number fewer than 10,000. The western North Atlantic subsistence fisheries take an increasing toll as their techniques improve and because their hunt is directed towards cows with calves. In addition, the humpbacks' coastal breeding areas are increasingly disturbed by high-speed boats, oil drilling operations and pollution, and each year several are entangled in fishing nets. The most serious threat of all may be depletion of their food supplies by fisheries.



The humpback whale is often found close to shore, where it is hunted by subsistence whalers, pursued by tourists, subjected to pollution, and has its major food supply caught for livestock feed.

## *The sirens' farewell*

The sirenians are big, gentle creatures which live in sheltered coastal areas, often traveling up rivers far inland. They feed on aquatic vascular plants, mangrove leaves, seagrasses and algae.

The four living sirenians, including three manatee species and one dugong, are all threatened. The Amazonian manatee *Trichechus inunguis*, once distributed throughout the Amazon system, has been hunted for its meat, fat and hide until today it probably numbers in the mere thousands. Although it is now protected in Brazil, Colombia and Peru, enforcement appears inadequate to prevent further depletions, especially in dry years when rivers are low and the animals are exposed.

The least well-known of all sirenians is the West African manatee *Trichechus senegalensis*. Although there are no reliable population estimates for this animal, it has been depleted by hunting until its range is greatly reduced, in spite of protection by national laws. It is also subject to incidental capture in fishing nets.

The West Indian or Caribbean manatee *Trichechus manatus* is declining throughout most of its range from Florida to Guyana. It may currently number only 5,000-10,000. Although in the past it has been depleted primarily by hunting and incidental catch, today it is increasingly subjected to destruction of its habitat by development and herbicide pollution. It is commonly struck by boat propellers and harassed by tourists. Protection measures have been introduced in most countries, but are incompletely enforced.

The single remaining species of dugong *Dugong dugon* is to be found in scattered populations along tropical and sub-tropical coasts throughout the Indo-Pacific. It appears to be nearly extinct throughout much of its range, although a few large populations have been located off Australia. Its overall population size is unknown.

The herbivorous sirenians like to travel up rivers to graze on water plants, where they are often slashed by boat propellers and harassed by tourists.

The tiny Indus river dolphin is one of the most endangered small cetaceans.

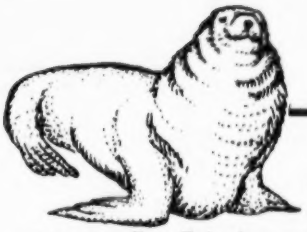
## *Blind to their fate*

River dolphins abandoned the sea for fresh waters long before human beings made it unwise to do so. All of them are now in varying degrees of trouble.

The Indus river dolphin *Platanista indi* is a tiny, essentially blind creature which hunts by echolocation. By all counts its population is so small — estimated at a few hundred — that the species verges on extinction, and is listed as "endangered". Once common in the Indus river and its tributaries, only a few hundred animals survive in restricted areas where, although they are protected by strict laws, illegal poaching and a shrinking habitat may complete their annihilation.

Another species in the Ganges river system, *Platanista gangetica,* faces many of the same problems and its status is uncertain. Although it is more numerous and widely distributed than the Indus dolphin, it is subjected to incidental catch as well as deliberately fished for meat and oil. Dam construction threatens increasingly to isolate its populations.

The Yangtze river hosts another river dolphin, *Lipotes vexillifer.* Its official status is "indeterminate", although it has been described in the Chinese literature as "very rare", and may be further declining due to conflict with local fisheries.



## *The skin trade*

Eared seals of the Family Otariidae, a group which includes fur seals and sea lions, are usually hunted on land at their breeding sites. The Japanese sea lion *Zalophus californianus japonicus* is probably already extinct as a result of hunting and disturbances to its habitat. It was last recorded in the 1950s.

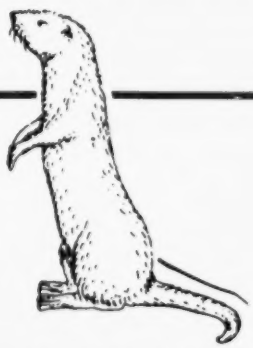
A similar fate once faced the Galapagos fur seal *Arctocephalus galapagoensis*. Once common throughout the islands, it was severely depleted by hunters in the 19th century, and was believed extinct until discovered on James Island in 1957. Now strictly protected, the survivors — which may number as few as 1,000 or as many as 10,000 — have trouble finding available habitats.

The Juan Fernandez fur seal *Arctocephalus philippii* and Guadaloupe fur seal *Arctocephalus townsendi* — each of which may number fewer than 1,000 — are also considered vulnerable as the result of extensive sealing. Both may recover under protection, but suitable habitats must also be preserved.

Other otariids are considered "rare". Hooker's sea lion *Phocarctos hookeri* is represented by as few as 5,000-7,000 individuals, and breeds only on a few sub-Antarctic islands. They are caught incidentally by squid fishermen. About 5,000 Australian sea lions *Neophoca cinerea* are restricted to a narrow breeding range on the southern Australian coast.

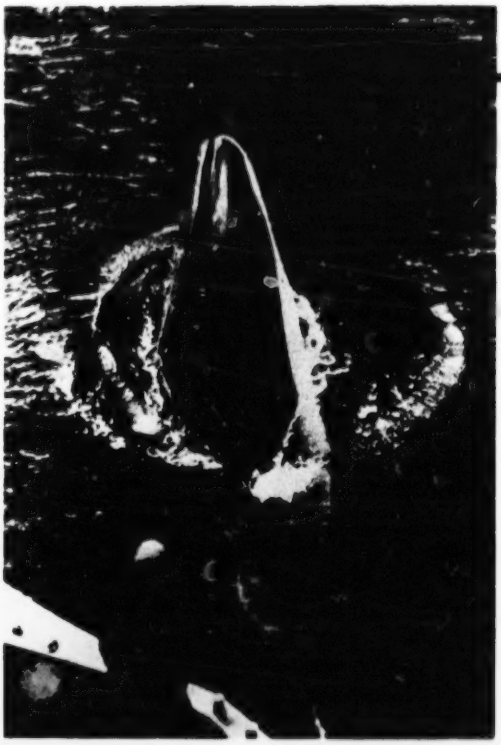
The walruses (Family Odobenidae) are found only in the Arctic. The Laptev walrus *Odobenus rosmarus laptevi*, which occurs in the Laptev and adjacent seas off the USSR, declined to about 10,000 individuals in the 1930s, and these have apparently not increased in spite of protective measures. Its Red Data Book status is "indeterminate". The Atlantic walrus *Odobenus rosmarus rosmarus* declined in a similar manner during the 1940s and 1950s because of hunting, and today is represented by as few as 20,000 individuals.

## *An otter nuisance*



The sea otter *Enhydra lutris* is one of the smallest marine mammals and one of the few animals to use tools, gathering stones from the seabed and using them to break open clams. By 1910, it was hunted almost to extinction for its glossy, dense fur. Its southern population, which inhabits the kelp beds off the west coast of North America, is still not completely out of danger. Today the otters are sometimes killed by California abalone fishermen who consider them a threat to their livelihood.

Two other otters appear to be in even more serious trouble. The marine otter *Lutra felina*, once abundant from Peru southwards, now numbers 200-300 in a few areas where it is still killed because it presumably interferes with the prawn fishery. The Southern river otter *Lutra provocax* is also found off the west coast of South America, but has been severely depleted by fur hunting to the point where its status is uncertain.



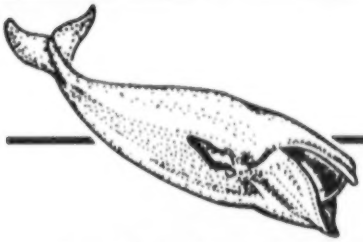
After overhunting the blue whales, whalers turned to the abundant fin whale, reducing its numbers drastically in less than 20 years.

Human beings have hunted whales and other marine mammals for thousands of years. Today over half a million marine mammals are killed each year in the direct, high-consumptive industries.

Whales have borne the brunt of the onslaught, primarily because their large size makes every kill profitable. But it was not until the late 18th and 19th centuries that improvements in hunting techniques (notably the introduction of steam-powered vessels with harpoon cannons in 1863) caused serious depletions of whale stocks. When sea-going factory vessels were introduced by Norwegian whalers in 1925, the whaling industry underwent yet another dramatic expansion. From that time until around the mid-1960s, whaling was one of the most productive and lucrative of the pelagic fisheries, but by the end of the 1970s stocks were depleted and the world catch was reduced to a fraction of its former levels. Whalers were driving themselves out of business.

One reason was that whalers operated under the principle of "rule of capture", which means that the living resource in question is common property until caught. Although this lack of jurisdictional rights over stocks probably had less influence on whaling than on fishing (since only a few countries had whaling industries), it was still enough to ensure that whalers would kill as many animals as they could.

Most modern whaling takes place in Antarctic waters, where stocks are still relatively abundant. Depletion of Antarctic blue whales encouraged whalers to turn to the abundant fin whale *Balaenoptera physalus*, taking 20,000-30,000 every year from 1948 to 1962. The destructive pattern was repeated, and by 1966 fewer than 3,000 fin whales were caught annually. The smaller but meatier sei whale *Balaenoptera borealis*, and the even smaller minke whale *Balaenoptera acutorostrata* then became major targets.





**Regulation: almost too late**

Regulation of the whaling industry began with the Norwegian Whaling Act of 1903, followed by more comprehensive national legislation in 1929. The first international agreement, which protected all right whales, suckling females and immature individuals, dates from 1935, but its 28 participants did not include Japan, Germany or the USSR. A market collapse in 1931, from oversupply of oil and failure of governments to reach an agreement, led the members of the Association of Whaling Companies to limit themselves to an annual Antarctic take of 320,000 tons. The agreement lasted two years.

In 1946 the International Convention for the Regulation of Whaling was adopted, with a provision that the utilization of whale stocks should be based on "scientific findings" so that optimum levels of whale stocks could be achieved and maintained. The International Whaling Commission (IWC) was formed to regulate the industry, and today includes 40 nations.

**Counting whales is difficult**

The IWC established a Scientific Committee to provide the information on which such determinations as total catch, length of seasons, species to be protected, and areas to be closed to whaling would be made. Catch quotas were eventually set for commercially-important species, often to protect the market for whale products as much as the whales themselves. Since 1960 the Scientific Committee has been involved in attempts to calculate "maximum sustainable yield" (MSY) levels which can be supported by various whale stocks. According to the IWC's New Management Procedure (NMP), a system initiated in 1976, hunting is regulated according to three categories: Initial Management Stocks, Sustained Management Stocks, and Protection Stocks. These were determined on the basis of how close observed stock levels were to the calculated MSY level.

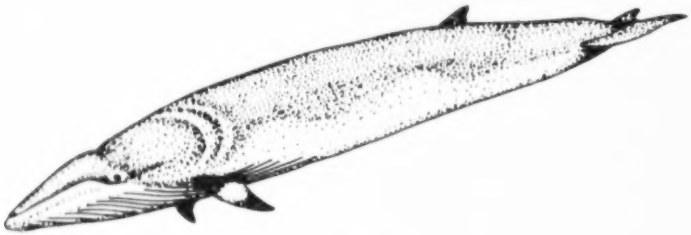
Some stocks of whales have been protected under the New Management Procedure, especially in the Southern Hemisphere, but total catches of all species still have declined. There are several serious problems in applying the NMP to whale stocks. Whale scientists differ widely on the validity of calculations of maximum sustainable yield. Some maintain that they are meaningless because of the unreliable population data and questionable assumptions on which the calculations are based. In addition, those species for which stock data are unavailable are not protected under the New Management Procedure. This encourages withholding of data. Unresolved taxonomic problems further complicate the counting procedure. All this makes the job of the IWC Scientific Committee very difficult, and yet it is expected to generate reliable estimates of stock and yield for a number of whale species every year.

The IWC determined to resolve some of the these problems by initiating the International Decade of Cetacean Research (IDCR). Beginning in 1975, cetacean biologists began generating a wealth of data which is now being analyzed, and plans are under way to continue the research programme into the second decade.

A grey whale *Eschrichtius robustus* breaching near shore. Although the western Pacific stock of grey whales is near extinction, and an Atlantic stock disappeared centuries ago, the eastern Pacific stock has recovered under protection to about 18,000 animals.

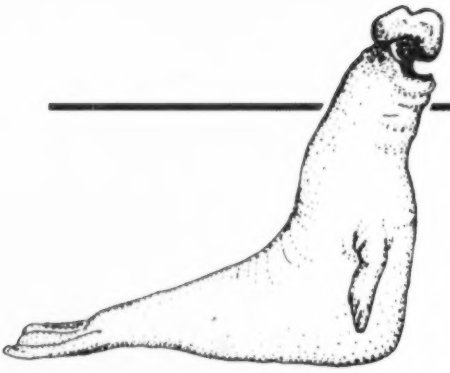
### Another try: the moratorium

The general failure of the New Management Procedure to protect whales led the IWC in 1982 to support the recommendation of the Stockholm Conference for a general moratorium on whaling, which would begin after the 1985/86 season. Immediately several of the major whaling nations submitted their formal objections to the ban, indicating their intention to continue whaling. Such objections are quite legal, and the IWC has no power to impose sanctions on the nations which choose to continue whaling after 1986. Therefore, the failure or success of the moratorium will probably depend on the threat of sanctions from those countries which support it.



### Sanctuary

In 1979 the IWC adopted a proposal that the Indian Ocean be made a whale sanctuary. Whales may not be killed within the area extending to 55° South. Efforts to extend the boundary further have so far been resisted because this would prevent further exploitation of the minke whale in the Indian Ocean.



Commercial takes of marine mammals other than the great whales do not come under IWC jurisdiction, although nearly all of them have been hunted commercially at some point.

At the moment there is very little known about populations of small cetaceans in the open ocean, partly because it is so difficult to identify them with certainty. One cetacean expert estimates that there are 50 to 60 species of small cetacean about which we know virtually nothing, and many species are known only from a single animal found stranded on shore. Nevertheless, several small cetaceans are thought to be exploited well beyond their optimum yields. These include stocks of northern bottlenose whales *Hyperoodon ampullatus,* spotted and striped dolphins *Stenella spp.,* harbour porpoise *Phocoena phocoena,* Dall's porpoise *Phocoenoides dalli,* and bottlenose dolphins *Tursiops truncatus.* In past centuries, pilot whales *Globicephala spp.,* belugas *Delphinapterus leucas,* narwhals *Monodon monoceros,* and several small delphinids were caught commercially as well.

Hundreds of thousands of phocid seals (some say more than a million) are killed in both hemispheres, usually in land- or ice-based operations. Both the northern Atlantic harp and hooded seals (*Phoca groenlandica* and *Cystophora cristata* respectively) have been greatly depleted by commercial hunting in the past century. The status of the harp seals is still in some doubt, although the current commercial catch is thought by Canadian officials to be sustainable. More information should soon become available when the inquiry recently initiated by the Canadian Government on all aspects of the seal hunt is completed. North Pacific phocids, the largha seal *Phoca largha* and ribbon seal *Phoca fasciata,* are also hunted commercially.

Fur seals are very efficient conservers of heat with their two coats of fur: the dense soft underlayer, which catches insulating air bubbles, and an outer protective layer of coarse hairs. This adaptation has also contributed to their doom: all the fur seals have been heavily exploited from the beginning of the 18th century, and many populations have been exterminated. Apparently all are well below original numbers.

Early this century an international controversy centred on the Northern fur seals of the Pribilof Islands of Alaska. The seals had been drastically depleted in the 19th century by hunting at sea, which was non-selective and thus more harmful to the populations than hunting on shore. Competition between several nations for the remaining herds led in 1911 to adoption of a convention abolishing sealing north of latitude 30° N, and sharing the take of skins from the Pribilofs among the signatories. Japan withdrew in 1941, after which the US, Canada, Japan and the USSR adopted an interim convention which outlawed pelagic sealing and created the North Pacific Fur Seal Commission. Thanks to these efforts the fur seals increased from about 125,000 to 1.5 million in 50 years, and today an average of about 30,000 seals are harvested per year. This is considered by some an exemple of successful management of a marine mammal resource, in spite of a recent population decline of the seals which may be due to fisheries competition.

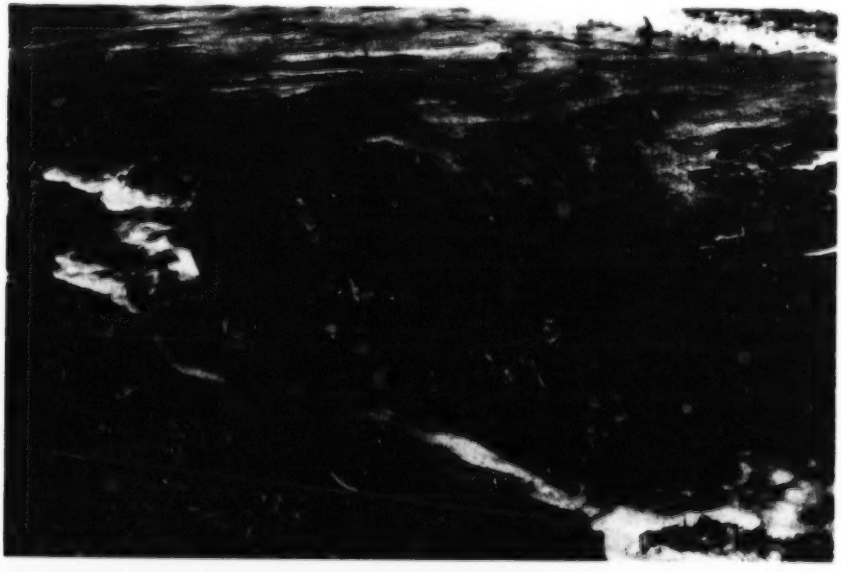
The walrus has been hunted in enormous numbers for more than two hundred years, mainly for its tusks and oil. Several times the species was driven to the edge of extinction, and it is thought that the current annual kill in Alaskan and Siberian waters is just barely balanced by the animals' reproductive rate. Although the current subsistence hunt by Eskimos seems to be sustainable, a careful watch should be kept on the status of the various populations to prevent a sudden catastrophic decline.

The largest pinnipeds are the elephant seals, three times as large as the largest walrus. The northern species *Mirounga angustirostris* is found mainly on the coastal islands off California and Baja California, the southern species *Mirounga leonina* on islands throughout the southern oceans. Hunted primarily for their oil, they became the major prey of seal hunters in the 18th century after the near extermination of the fur seals. By 1900 few remained, and last-minute protection measures saved the species. Today a few thousand are killed annually, mostly on the island of South Georgia.

Polar bears *Ursus maritimus* were over-hunted during this century. The Norwegian/USSR/Greenland population fell to a precariously low level of 1,000 animals in the early 1970s. Protective measures were introduced in 1973, and the population has doubled since that time; increases were also reported in the US and Canadian populations. Now that the species is recovering, there is strong pressure to resume commercial hunting, especially by trophy hunters. Some trophy hunting is permitted in Canada under carefully controlled conditions, but otherwise only subsistence hunting is allowed. Some scientists feel that even this level of hunting is too much for the current world population of about 30,000 to support, and recent studies indicate that the number which can be safely harvested is much lower than previously thought. Today the polar bear faces additional threats from growing tourism and industrialization in the Arctic.

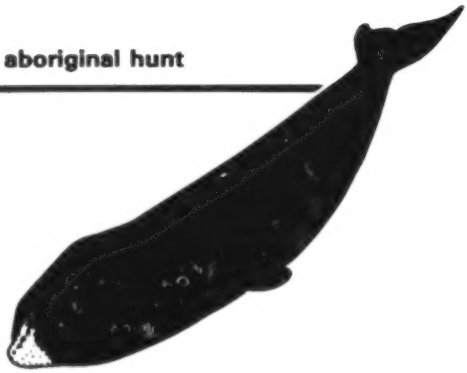
Polar bears continue to be hunted, although some scientists think the number of kills permitted is too high.

Following the introduction of protective measures, populations of the Northern fur seal have recovered from the drastic depletions of the 18th and 19th centuries.



This beached false killer whale *Pseudorcas crassidens* appears to have been harpooned but not captured. Such inefficient hunting methods led to a public outcry and IWC limits on the number of animals struck rather than the number landed.

## BOWHEADS AND BELUGAS: The aboriginal hunt



Small-scale aboriginal or subsistence whaling by Arctic peoples has been carried out at sustainable levels for centuries, providing food, clothing and raw materials around which their way of life was patterned. But subsequent commercial hunting and other human activities have depleted many coastal mammal populations to the point where today they cannot sustain even a limited aboriginal hunt. The result has been severe and often emotional conflicts between governments and conservationists on the one hand, and indigenous peoples whose traditions and very lives are at stake on the other.

A case in point concerns the western Arctic bowhead whale. Eskimos began hunting this whale in the Bering Strait around 500 B.C. By the year 1200, as many as 60 whales were taken annually, providing food and a basis for religious and artistic traditions.

After American whalers discovered bowhead whaling grounds in the mid-1800s, the Eskimos were employed in the whaling industry where they were taught to use guns and participate in a cash economy. When overexploitation caused the industry to collapse, they were forced to return to subsistence hunting. A relatively steady level of hunting was maintained until the mid-1960s, when the number of Eskimo whaling crews began to increase. The number of whales killed grew, and today the population seems unable to sustain any more losses.

The bowhead, once so abundant that it was called the common whale, has now been hunted to a critical level throughout its range, and a battle is raging between conservationists and the Alaskan Eskimos who want to continue exploiting its remnant population. The Eskimos claim that their heritage is at stake; conservationists say the very future of the species is threatened.

The Eskimos still hunt the bowheads from open boats using the bomb lances and shoulder guns developed in the 19th century, and the resulting inefficiency and wastefulness of the hunt has become another bone of contention: in 1977, in addition to the 26 whales landed at Alaskan villages, 78 were struck and lost.

Beginning in 1978, the IWC has has tried to address this problem by limiting the number of whales struck instead of the number recovered, hoping to provide an incentive for improvement in techniques and efficiency. For the 1984-85 season, the quota was set at a total of 43 struck with no more than 23 landed per year.

Although the Eskimo hunt has been in compliance with the quotas nearly every year since they were established, we still don't know how many bowheads there are and whether the quotas are realistic. The Eskimos have resisted efforts to substitute the relatively more abundant grey whale for the bowhead.

The debate continues; meanwhile the future of the bowhead has been further clouded by imminent petroleum exploration and production in areas thought to be its breeding grounds. A few oil spills could quickly make the conflict between the Eskimos and whale conservationists obsolete.



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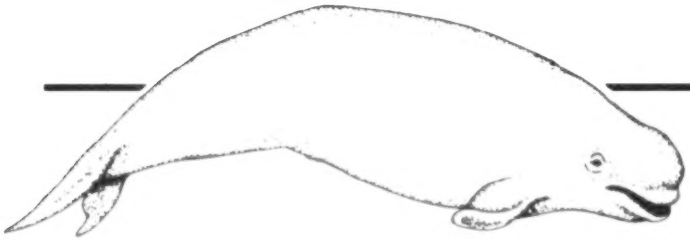


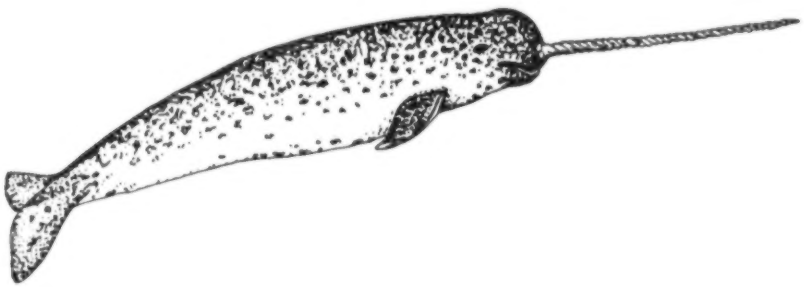


Other Arctic mammals are hunted for subsistence by Arctic peoples. Belugas *Delphinapterus leucas* are found in shallow waters, rivers and estuaries of the Arctic, while their close relatives, the narwhals *Monodon monoceros* inhabit deeper waters. Both species have been hunted for centuries with hand-held harpoons launched from kayaks. The blubber and skin of the narwhal is consumed by humans, their meat fed to sled dogs, their tendons used for sewing, and their tusks ground into medicinal powder. The beluga is hunted for its meat and valuable white skins.

But in both cases what was once a sustainable indigenous fishery has been converted by modern technology into yet another instance of uncontrolled overexploitation. Hunters in boats and snowmobiles shoot narwhals with modern firearms, remove their tusks to sell for cash, and discard the rest of the animal. As many as 3,000 belugas are shot each year, or driven into stake traps, primarily for their skins. Probably an even greater number are shot and lost.

Whether these can still be considered subsistence fisheries is a matter of debate. The use of modern weapons and the effects of the cash economy have greatly changed the nature of the hunt. Both animals have been overhunted, and are in further danger from oil exploration, shipping and other aspects of Arctic development.

Belugas are thought to be exploited well beyond their sustainable yield; one stock is reported to be at 10-15% of its initial size. Catch quotas have been set for at least one stock, and the IWC Scientific Committee has recommended that the beluga be classified as a protection stock and its catch limit set at zero. Although there is similar concern for the narwhal, its status is unknown.



Subsistence whaling appears to set concern for the traditions and well-being of humans at irreconcilable odds with concern for survival of the bowhead and beluga. But after the shouting dies down, the opponents in this particular debate may well discover themselves on the same side of the table. If the bowheads and belugas are heading towards extinction, their indigenous hunters are living on borrowed time.

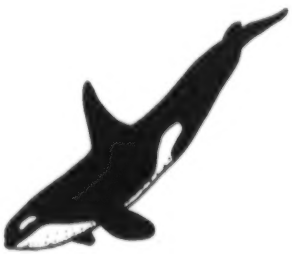
## PESTS AND PILFERERS?

People who live off the sea often regard marine mammals as nuisances or as serious competitors for fish or shellfish. Whales get tangled in their nets, dolphins steal their fish, seals remove their bait. A reduced catch or damaged gear can make a fisherman see red and reach for his gun.

The fisherman may or may not help his situation by shooting the animals that damage his equipment, but his anger reflects a very real problem: marine mammals do millions of dollars' worth of damage to fishing gear every year. And the cost of repairing the gear is small compared to the loss of fishing time involved. For example, in 1979 an estimated half a million dollars' worth of damage to gear was reported by the Newfoundland cod fishery; the value of the catch lost while the gear was being repaired was put at $3 million.

Pinnipeds and cetaceans are also known to eat or damage fish already caught in nets, although reliable estimates of the cost of the damage have not been made.

The killer whale in the North Atlantic is an example of an oceanic mammal which preys on a major commercial fish species, the Norwegian spring herring. Overfished until it declined dramatically, the herring is now carefully managed. Fishermen deliberately kill large numbers of killer whales on the assumption that they catch enough herring to impede recovery of their fishing stocks. So far there is no evidence for or against this.



Fishermen in Japan consider Risso's dolphins *Grampus griseus* and bottlenose dolphins *Tursiops truncatus* great nuisances, and with some reason. The dolphins will sometimes arrive in large numbers, stealing bait and dispersing schools of yellowtail. But the fishermen also blame the dolphins for a decline in yellowtail catch in recent years, which may in fact be a result of overfishing. When large schools of dolphins are located near fishing grounds, the fishing fleet drives them ashore and kills them with knives. But no one knows what effect, if any, the dolphin cull has on the yellowtail.

Other marine mammals which have been blamed for depleting fishery stocks include the grey seals around northern Britain which prey on salmon, the harp seals in the Northwest Atlantic which prey on a small fish called capelin, and the Northern fur seal which feeds on pollock. The walrus in the North Pacific is a specialised feeder on clams which are being considered for their commercial potential. In each case the mammal is seen by fishermen as a serious or potential competitor, although there is no solid evidence to suggest that culling of the mammal would result in more prey being available to the fishing industry.

Another important feature of marine mammal/fishery interactions arises from the fact that human beings are exploiting ever larger numbers of marine animals. We are catching smaller and smaller fish for livestock feed, more exotic foods such as sea urchins, new species of shellfish — and are thus creating more sources of conflict with mammals who feed on these creatures.

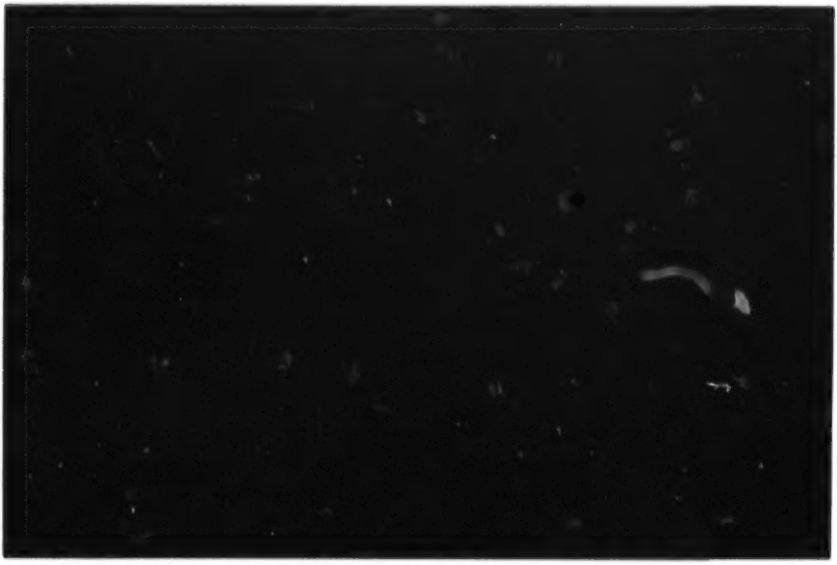
## IT WAS AN ACCIDENT

Another kind of interaction between marine mammals and fisheries involves what is called "incidental" kill or capture. This happens when the animals — usually small cetaceans or pinnipeds, but sometimes great whales as well — become entangled in nets or other fishing gear and drown. Hundreds of thousands of cetaceans are killed or injured accidentally in fishing operations each year. Over 9,000 harp seals were killed one year in nets of cod fishermen in the North Atlantic; in another year, 700 fur seals were killed in the Aleutians salmon fishery; hundreds of sea lions are taken by Soviet trawlers in the North Pacific; an unrecorded number of sea otters, manatees and dugongs are likewise trapped.

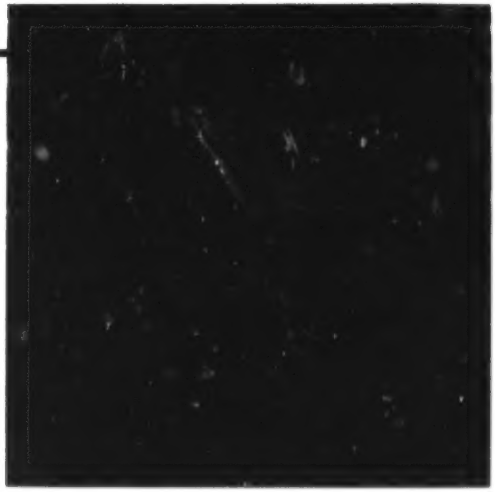
Gill net fisheries have taken the greatest toll, especially after the introduction of synthetic monofilament nets which the animals apparently cannot detect. The North Pacific gill-net salmon fishery is responsible for the incidental kill of Dall's porpoise — as many as 20,000 each year, a rate considered potentially disastrous for the population.

Tens of thousands of dolphins (mostly spotted and spinner dolphins of the genus *Stenella*) are caught annually in the Eastern Tropical Pacific purse seine fishery for yellowfin tuna. For some unknown reason the dolphins live in close association with schools of tuna, and fishermen often use the dolphins to indicate their location. Naturally, when purse seines are closed around the fish, many dolphins are caught and suffocate. Before recent modifications were made in fishing methods and gear in order to reduce incidental mortality, an even greater number were killed.

Of the great whales, the humpback is probably most susceptible to accidental catch. As many as 35-40 are reportedly trapped in fishing nets off Newfoundland every year, and a recent increase in the number of such interactions may be the result of the whales coming closer to shore in search of prey. ♦



A dolphin of the genus *Stenella* photographed off the Bahamas.



Risso's dolphin *Grampus griseus* is sometimes caught for display in public aquaria. Almost nothing is known about its status in the wild.

## WHAT A NICE SMILE!

**Non-consumptive uses of mammals**

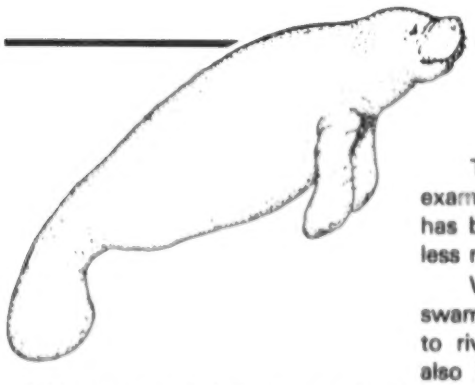
In recent years marine mammals have increasingly been captured alive for a variety of purposes: public exhibition in marine aquaria, training for specific tasks, scientific research. Although it is not yet carried out on a scale to endanger the species involved, live capture is unregulated in most countries and is therefore a potential threat.

There are ethical concerns as well: capture methods are often harmful; many are kept in deplorable conditions; large numbers die in captivity. There is evidence that captive individuals experience intense physical, social and psychological discomfort. Dolphins, normally very communicative, become aphonic in captivity, and their brain weight decreases as much as 30%. Although some animals become subjects of valid scientific study, others become victims of insensitive and unregulated experimentation by unqualified "animal psychologists". Others are trained to participate in military activities and weapons development; they are ideal for this because they are intelligent, they are good divers, and they are expendable.

But most captured marine mammals are transformed into public performers, trained to jump through hoops and have their teeth brushed before an unwitting public which believes that the ever-present "smile" of the bottlenose dolphin really is an expression of pleasure.

As people become aware of the harmful effects of captivity on marine mammals, they may prefer to see them in their natural habitat. "Whale watching" societies have begun following humpbacks and other cetaceans. But this, too, can disturb the animals. Both the US and South Africa have imposed regulations to control whale watching.

On the other hand, allowing a fascinated and loving public to see these creatures can be an important factor in building support for conservation efforts. A balance must be found, based on knowledge about marine mammals and how we can enjoy them without harming them.



**Putting them to work**

The Caribbean manatee is an example of a marine mammal which has been put to work under more or less natural conditions.

When Dutch colonists drained the swamps of Guyana and built sea walls to rival their homeland's dikes, they also had to devise an elaborate and reliable system of drainage canals. But the tropics had a surprise for them: the canals became clogged with fast-growing water plants. It seemed that huge amounts of money and effort would be needed to clean the canals, until someone thought of manatees.

A number of manatees were captured and released in the canals, where they ate their fill and cleared the waterways. The system has been in place for over a decade, to the satisfaction of the Guyanese, and perhaps of the manatees as well.

The use of manatees for similar purposes throughout the Caribbean is under study. It is also being used as a strong argument for their conservation. But extensive use of manatees for tropical weed control is years away. Wild stocks are too depleted to support large-scale removal, so ways must be found to breed them in captivity. This will involve further research on their physiology, nutritional requirements and reproductive biology.

Manatees are opportunistic feeders on almost any water plants that are available – including those which clog navigation channels.

When humans and marine mammals compete for food, the only sure losers are the marine mammals. Although there is no real evidence that marine mammal predation has a substantial effect on fisheries catch, there are several instances of humans having depleted the mammals' food source.

As humans cause the collapse of one major fishery after another from overexploitation, and as they then turn to smaller, less attractive species, marine mammals can be hard hit. Fur seals in the Bering Sea have declined greatly in recent years as fishing for their major prey, the Alaska pollock, has intensified. Humpback whales, already badly depleted by directed and incidental killing, face yet another problem: capelin, a small fish considered unfit for human consumption, is a principal food of humpbacks, harp seals and cod. When a new industry grew up around the exploitation of the fish as a basis for animal feed, it was only a short time before overfishing caused a collapse in capelin stocks. About this time, the humpback began to be increasingly sighted inshore, perhaps in search of food.

## The case of krill

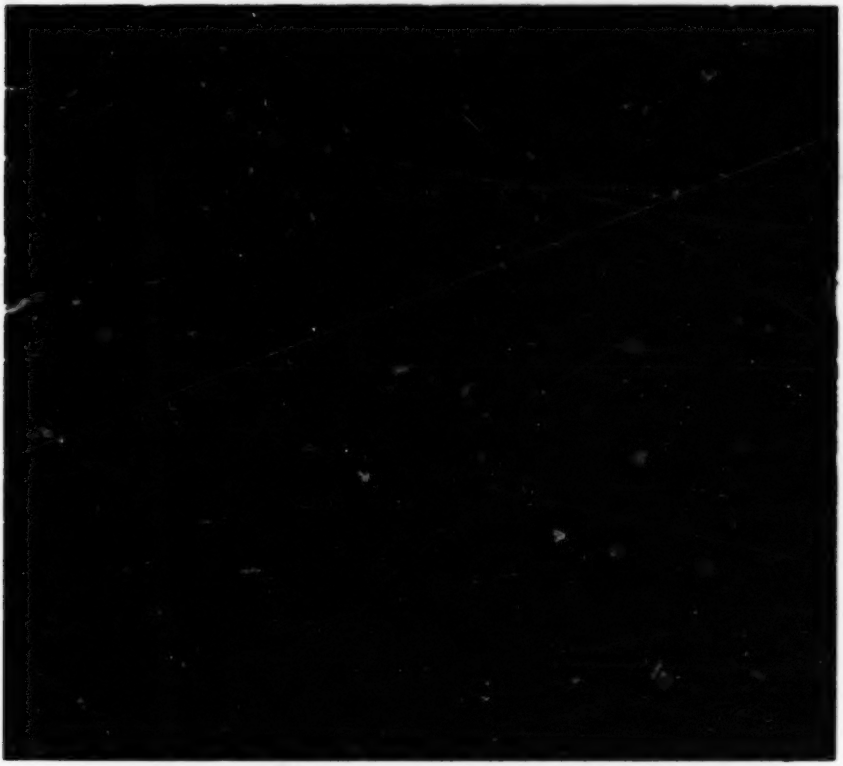
A relevant question at this point is: how much can we expect from regulations designed to protect marine mammals directly, given that we are rapidly destroying their food sources? Take, for example, the case of krill.

Nowhere has the decline of the great whales been so dramatic as in the Antarctic. Modern whaling methods were introduced to the region early this century, and populations of humpback, sei, blue and fin whales have been reduced to a fraction of their original numbers. Minke whales could be next in line, unless the moratorium on whaling is supported by the remaining whaling nations.

But even if the moratorium succeeds, and all whaling stops, the baleen whales may not survive. Their major prey, a small crustacean called krill, is now the target of the Antarctic fisheries which have already caused the devastation of finfish stocks in the area, including the Antarctic cod. Unless adequately regulated, the fishery could easily take enough krill to spell the whales' doom, regardless of all efforts to protect them. It is thought that even a very small krill fishery could impede recovery of the blue whale.

Several other Antarctic animals could be affected by a decline in krill, which is a major component of their diet. These include the Antarctic fur seal, the crabeater seal, penguins, squid and several species of fish.

In 1978 a Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) was drafted. It was unusual in that it addressed the Antarctic ecosystem as a whole rather than species-by-species. The Convention was designed to conserve and rebuild fish stocks and to prevent depletion of important prey species, such as krill. So far, hopes that it would lead to effective regulation of Antarctic fishing have remained unfulfilled, and the CCAMLR Commission's management efforts have come under increasing attack from conservationist groups.



Steller's sea lion *Eumetopias jubatus*, which is the most northerly species of sea lion, is especially wary of man and will usually flee when disturbed.

### Too little space

As human populations grow, coastal areas are subjected to growing pressure from development activities and tourism. This often involves the destruction or alteration of "critical habitats" for animal species — defined as those areas or resources required to sustain viable populations. These differ among species, but in the case of marine mammals generally include breeding and feeding grounds.

The coastal pinnipeds are perhaps most susceptible to this kind of disturbance. Fur seal rookeries and the nearshore phocid seal habitats are increasingly disturbed by careless tourists as well as curious and well-meaning animal lovers; the remaining Mediterranean monk seals have been chased to remote areas by tourism and expanding industries. Since some species are found on only a few islands, a further decrease in available habitat could exterminate them; this is the case for southeastern Pacific fur seals and sea lions in the Antarctic and Australia.

Shrinking habitats could also threaten all of the sirenians, the river dolphins of Asia and humpbacked dolphins of South America.

## A spreading menace

Coastal species of marine mammals quite literally carry an additional burden, resulting from increasing pollution of their habitats by chemicals, oil, sewage and silt. The tissues of many of them are loaded with the residues.

We know very little about the effects of marine pollution on the mammals. We do know that dolphins have been subjected to corrosive materials released into the sea, often causing tissue damage and sometimes death. Fortunately some are able to sense, and avoid, pollutants: The bottlenose dolphin disappeared from San Diego Bay (California) when pollution levels rose, and was seen again only when dredging and sewage disposal in the Bay stopped.

Crude and mineral oils spilled into the sea cause particular harm to marine mammals by affecting their buoyancy and thermoregulation. Oil pollution is fast becoming a global problem: the walrus and other polar mammals may soon face serious consequences from planned exploitation of Arctic oil deposits. And if Antarctic exploration is permitted, innumerable animals will be affected. Oil degrades very slowly at low temperatures.

This Galapagos fur seal pup has encountered an increasingly severe problem for all coastal marine mammals – the coating of rocks and beaches with oil.

Pacific white-sided dolphins have been found to carry a large burden of DDT in their tissues.

Pesticides are known to affect mammalian reproductive systems. Pinnipeds, which are long-lived, are especially likely to accumulate large amounts of persistent organochlorines and polychlorinated biphenyls (PCBs). Some observers think that these chemicals are responsible for the decline of grey seals *Halichoerus grypus* and ringed seals *Pusa hispida* in the Baltic. Extremely high residues of DDT have been found in harbour porpoises *Phocoena phocoena* in the North Atlantic, Pacific white-sided dolphin *Lagenorhynchus obliquidens*, Atlantic and Pacific pilot whales *Globicephala spp.* and striped dolphin *Stenella coeruleoalba;* varying levels were found in all but one of 69 small cetaceans caught in various regions of the Pacific and South Atlantic.

High levels of PCBs have been linked to spontaneous abortions in California sea lions *Zalophus californianus* and Baltic seals. Heavy metals are known to accumulate in the sea's "food chain", reaching a maximum in higher predators, including many marine mammals.

Other kinds of pollution take a toll. Beach-goers have noticed hundreds of seals entangled in plastic debris and pieces of discarded or lost netting. And there are indications that noise pollution from ships and small boat propellers could greatly interfere with the undersea communication systems of whales and dolphins.

High levels of PCBs are thought to have caused reproductive failures in California sea lions *Zalophus californianus*. These animals are familiar sights in zoos and circuses, owing to their intelligent and playful natures.

## *Should we kill them?*

There are a number of ethical questions involved in our use of marine mammals. One issue given some prominence in the media may be illustrated by the question, "Since whales and dolphins are so intelligent, so useful to us alive, and seemingly so much like us, should we be killing them at all?"

An appreciative public responds to the charms of even the most common species of seal. Here a crabeater seal *Lobodon carcinophagus* is shown with her pup.

### Brains and charm

A number of similarities have been found between the cetacean brain and the human brain. The most notable is their large proportion of neocortex, or "grey matter", which we associate with intelligence. Whales have also developed parts of their brains in ways we have not, which may be associated with their remarkable methods of communication using sonar and echolocation and their complex social behaviour. Some scientists are convinced that cetaceans probably possess additional senses and abilities we have yet to discover.

Many people feel that we sould not exploit such animals for their flesh. This attitude is often inspired by the cetaceans, seals and otters, which seem so full of personality, and create such affection and empathy in their observers.

**Harpoons and harp seals: "humane" killing**

Another view is that we may continue to exploit marine mammals, but only for essential purposes and with extreme care that they are killed in a humane fashion. It is concern over the apparently brutal way that infant harp seals are killed — by hunters clubbing them on their heads — that has caused a world-wide public outcry, more than concern for the harp seal population as a whole. And the issue of "humane killing" of whales is one which has increasingly occupied the IWC in recent years.

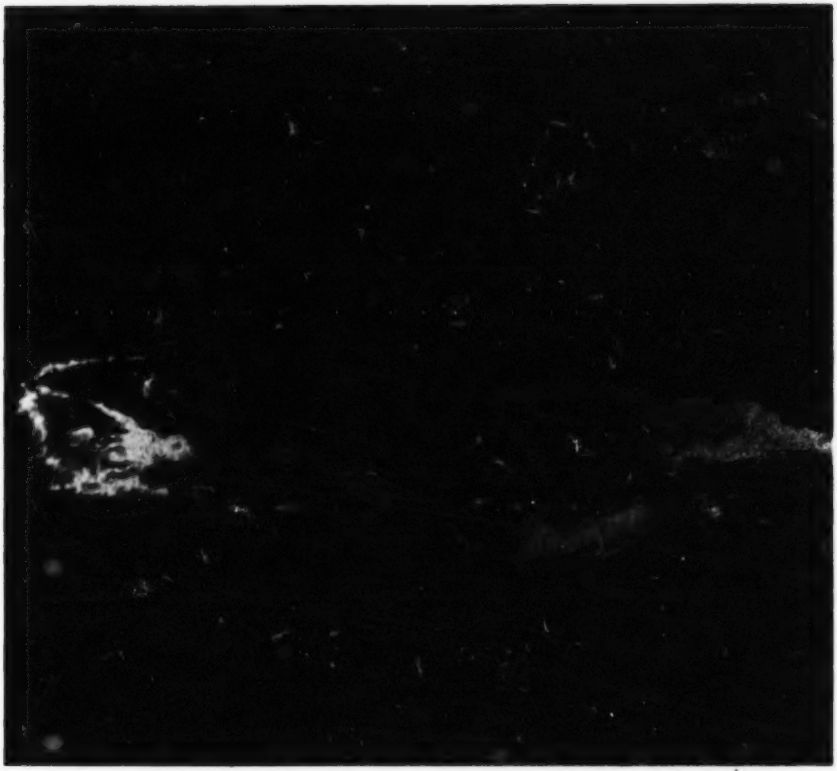
All commercial whaling operations use harpoon cannons. An explosive head is used for the larger whales, detonated by a time fuse and exploding inside the animal after the harpoon has entered, causing death from damage to the major organs.

Sometimes the whale does not die immediately, in which case a second, "killer" harpoon is fired. This is considered a "commendable humane practice" by the IWC subcommittee charged with the matter.

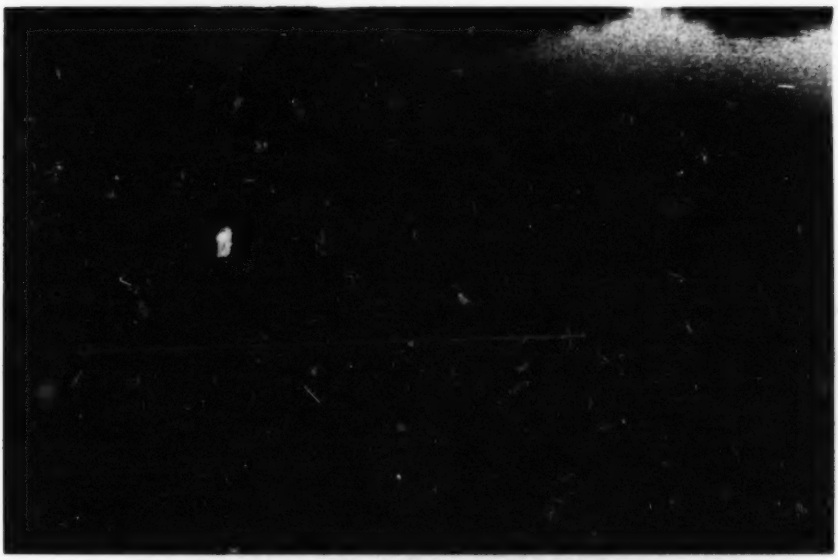
The harpoon gunner must shoot at a moving target, often in rough seas. Such difficulties ensure an occasional miss, and many gruesome accounts have been related of long, agonizing deaths of whales improperly harpooned. The small minke whales are killed with harpoons carrying non-explosive heads. This protects their meat; it also means a slower death.

The Japanese and Norwegians have made some progress recently in developing more humane techniques, including a more efficient harpoon head which kills by shock rather than exploding shrapnel, and use of an electric lance to kill the whale after it has been brought to the side of the boat. The use of drugs is also being considered, although problems concerning dose, method of delivery, and drug residues in meat have yet to be solved.

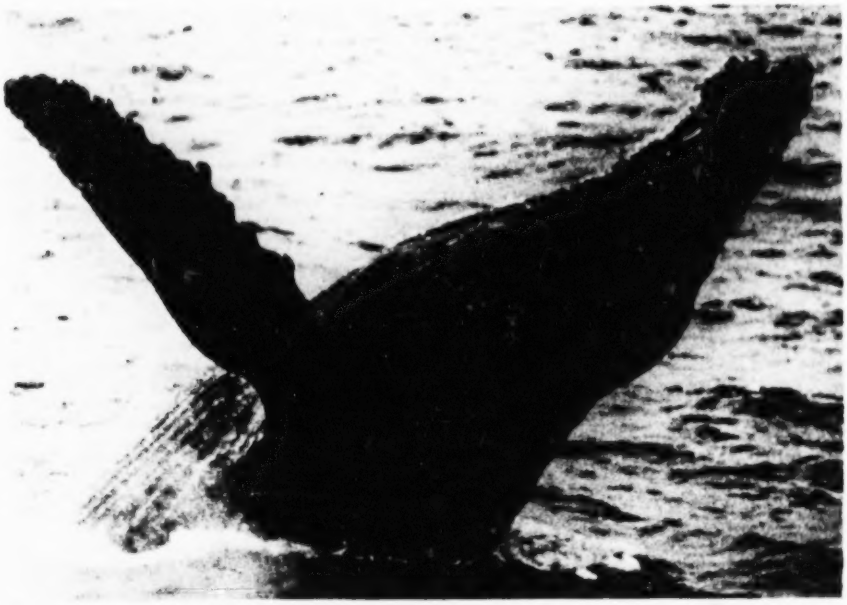
It is generally agreed that methods in use are acceptable only when they work and result in a quick death. This is often not the case, even though they are considered to be the most reliable and fast methods currently available. A great deal of work has yet to be done to ensure that marine mammals killed for consumption receive the same consideration we give to pigs and cattle.



A harpooned fin whale *Balaenoptera physalus* surfaces. Once plentiful Antarctic stocks of this species fell well below maximum sustainable yield levels in the mid-1950s.



The small minke whale, the last hope of Antarctic whalers, is hunted with a cold harpoon, which protects the meat but lengthens the time it takes the whale to die. This specimen, attached to a red float, was caught off Greenland.



Humpbacks are baleen whales whose enlarged, pleated throats distend when feeding. The throat grooves of this breaching humpback are clearly visible.

### Cosmetics and cat food

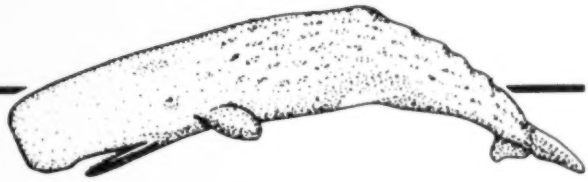
Many products are derived from whales. The baleen whales provide meat and edible oil used mostly for pet food and as a luxury food for humans.

The largest of the toothed whales, the great sperm whale *Physeter macrocephalus,* has been a mainstay of the whaling industry since its capture began in the early 18th Century. The annual world catch surpassed 20,000 in the mid-1960s, after which a variety of regulations were imposed. Size estimates for the remaining populations vary greatly, and none are considered reliable, The attention of scientists and the public has been caught by the many remarkable social and behavioural characteristics of these creatures.

Sperm whales are valued commercially for the great quantities of meat, oil and other products which can be recovered from a single animal. Sperm whale oil is produced when blubber and the contents of the spermaceti organ in the whale's head (thought to be used for buoyancy control) is cooked and refined; it is used for fine machine lubrication and tanning leather. Spermaceti wax, which solidifies when the crude sperm oil is cooled, is used in polishes, cosmetics and skin creams. Whale teeth provide ivory for ornaments and jewelry. Ambergis, formed in the stomach and intestines of sperm whales, is used in soaps and perfumes.

In addition, the residues from whale tissue rendered for oil is high in protein and useful as additives in livestock feed.

Conservationists argue that killing whales for these products is wasteful and unnecessary. When the US and New Zealand banned imports of all whale products in 1971 and 1975, respectively, it was partly because substitutes for all these products could readily be found.



When the Australian government looked into the matter in the late 1970s, it was discovered that substitutes were available for almost all commercial whale products used in that country. The only exceptions were certain applications of sperm oil and spermaceti wax, although for most purposes there were alternatives for these as well.

It was discovered that oil from the jojoba shrub is a suitable replacement for sperm oil in almost every case; it even has a similar chemical composition. But the jojoba is not yet produced in sufficient quantity for widespread commercial use.

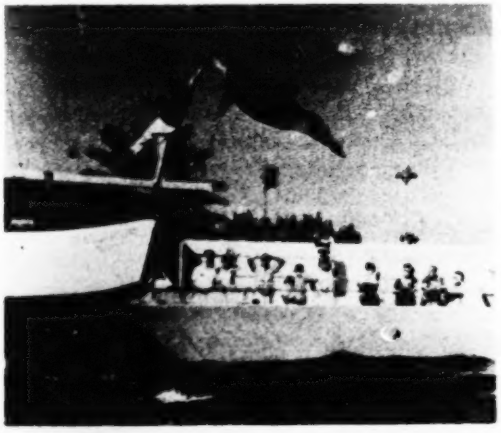
Chemists are able to manufacture the components of sperm oil from petrochemicals; these can then be blended to produce a synthetic substitute. It is only the relative expense that has so far kept this alternative from being widely adopted.

Substitutes for spermaceti wax have likewise been found for cosmetics and other products. They are synthesized from vegetable and animal oils, and available at prices comparable with that of the whale wax.

## Alternative employment

An important effect of the end of whaling would be loss of jobs in the whaling and associated industries. This would hit some countries harder than others, and in many cases the people involved could rightfully demand some form of compensation, such as alternative employment or direct payments.

But the whaling industry itself is being phased out for economic factors well beyond the influence of conservationists. Market trends, declining prices for whale products, rising operating costs, increasing regulation, obsolete equipment and the depletion of the whale stocks themselves long since foretold the inevitable decline of the whaling industry. In the meantime, lucrative new commercial enterprises have been built around non-consumptive uses of cetaceans as entertainment, as tourist attractions, and as objects for study.



Businesses based on non-consumptive uses of marine mammals offer a lucrative substitute to whaling.

Greenland Inuits, subsistence hunters of adult seals, have been hard hit by declining sealskin markets.

## *Between two worlds*

As markets for marine mammal products fluctuate, human beings may also be victims.

Take, for example, the Inuits of Greenland, who for centuries have depended on the seal hunt for their livelihood. They do not hunt harp seal pups, for these animals breed farther west in Newfoundland. They hunt mainly ringed seals, which are common throughout the Arctic. They hunt with harpoons and rifles from dog sleds and kayaks, killing only adult animals. And they use the entire seal: seal meat makes up a major part of their diet and that of their sled dogs, and the bones are used for tools and handcrafts. The skins are made into clothing and prepared for the export market, providing income for the sealers' fuel, ammunition and other necessities.

Today the Inuits are caught between two worlds: the old life of subsistence, dependent on the resources of their immediate environment, and the new life of consumerism and improving standards of living, increasingly dependent on trade with the outside world.

But the Greenland Inuits are finding their new way of life even more precarious than the old: they have in recent years been the victims of a fall in the sealskin market. Initially it was thought this might be the effect of public concern for harp seal pups spilling over to affect adult seal products. But since adult seal skins are also used for leather, another cause could be the recent flooding of the leather market with Australian kangaroo skins.

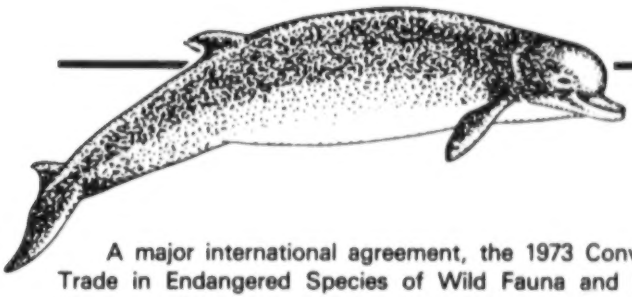
Whatever the reason, the plight of the Inuits demonstrates how increasing dependence of formerly subsistent cultures on a cash economy can lay them open to economic devastation. Their reliance on a single product, coupled with changing lifestyles and gradual abandonment of traditions, makes peoples like the Inuits easy victims of economic instability. Their future, like that of the Alaskan Eskimos who are hunting the last of the bowhead whales, is as uncertain as that of the threatened marine mammals.

An increasingly common method used by environmentalists, from international organizations to public action groups, is the declaring of formal or informal injunctions against commercial trade in the animals they wish to protect from population depletion or cruel treatment. For example, prodded by public opinion opposed to the clubbing of harp seal pups for their skins, the European Parliament has proposed an idefinite embargo on trade in the thick, white fur.

Several countries have adopted national legislation protecting marine mammals and their habitats. Some have gone a step further by restricting all trade in the animals and their products. In the United States, the 1972 Marine Mammal Protection Act established a moratorium on the hunting, harassing, capturing or killing of marine mammals in US waters or by US citizens on the high seas, and extended the moratorium to the importation of marine mammals or their products into the country (making special provision for subsistence hunting in Alaska).

The 1973 US Endangered Species Act prohibits the taking, importing, possessing, delivering, carrying or selling of threatened and endangered species, live or dead. It includes all cetaceans, and recognizes the importance or preserving the habitats of the species in question. The 1976 Endangered Species Act of the United Kingdom requires that a special license be obtained for import or export of threatened species.

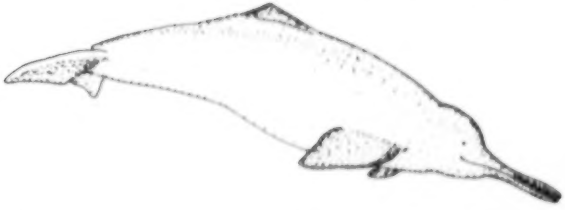
Public affection for harp seal pups, huge numbers of which are killed in Newfoundland each year, has led to effective embargoes on their furs.



## CITES

A major international agreement, the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, contains import-export restrictions on about a thousand species of rare animals and plants, living or dead, and on products from these animals. They are listed in three appendices according to their conservation status. Those threatened with immediate extinction are found in Appendix I, while Appendix II contains those which could become extinct if trade were not regulated. Appendix III lists species which individual governments wish to regulate within their borders.

**Appendix I** forbids all commercial trade in several species of marine mammals, including the marine otter, the sea otter off the coast of western North America, the Guadaloupe fur seal, all species of monk seal, the West Indian and Amazonian manatees, and the dugong outside of Australia. Also included are several species of cetaceans: the Indus, Ganges and Yangtze river dolphins; the humpbacked dolphins; the sperm whale; all beaked and bottlenose whales; the gray whale; the bowhead whale; the pigmy right whale; the humpback whale; and the five species of genus *Balaenoptera* which includes minke, sei, Bryde's, blue and fin whales.



**Appendix II** lists plants and animals which may be traded with special permits. It currently includes cetaceans not mentioned in Appendix I, all of which will move into Appendix I on 1 January 1986. It also lists polar bears, all six remaining fur seal species of the genus *Arctocephalus*, both species of elephant seal, the remaining otters, the West African manatee, and the Australian population of the dugong.

**Appendix III** protects species within national borders, and currently lists the walrus in Canada.

# A PLAN TO SAVE MARINE MAMMALS

We have seen that marine mammals are threatened in a number of ways, by direct killing, by accidental capture, and by our inadvertent destruction of their food and habitats. Marine mammals all over the globe are threatened; there is no longer anywhere to hide.

This underscores the need for a programme for the conservation and management of marine mammals to be *global*, as well as regional and national, in its scope, and that it approach the ecosystem as a whole. Otherwise the success attained in one sphere will be undermined by the failure in another. We will save the humpback whale from hunters but drive it from its breeding grounds; we will protect the sea lions' habitats but load them with enough pesticides to inhibit their reproduction; we will outlaw the culling of dolphins only to suffocate them in tuna nets; we will lower the catch limits of Antarctic minke whales but starve them of krill.

We have also seen that most of the arguments against such protection — that jobs will be lost, that traditions will be destroyed, that food sources will be removed at a time of global hunger — are in fact arguments for saving these animals, for if we hunt them to extinction we lose a valuable and irreplaceable resource. And if we do so wantonly, cruelly, and wastefully, we lose some of our humanity.

*A global approach*

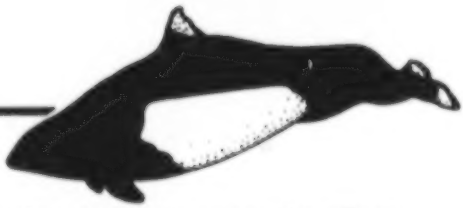
Public concern for the plight of marine mammals has stimulated a number of attempts to protect them at the national and international levels. In addition to the IWC Convention, the Antarctic Convention, the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Marine Mammal Protection Act of the United States mentioned above, these include the 1978 Convention on the Conservation of Antarctic Seals, the 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals, the 1979 Council of Europe Convention on the Conservation of Wildlife and Natural Habitats, the 1968 African Convention on the Conservation of Nature and Natural Resources, and the 1980 Australian Whale Protection Act.

Relatively little is known about the Australian sea lion *Neophoca cinerea*, its populations having been drastically reduced by sealing before scientists could study their habits and range.

The United Nations has seized the opportunity to draw these and other conservation efforts into a single global programme for marine mammals.

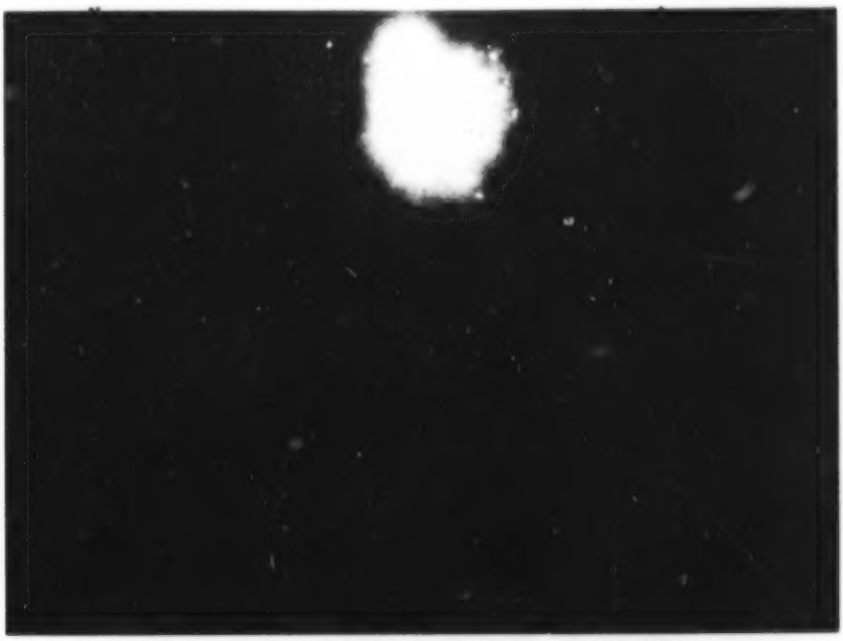
The first steps were taken in 1972 at the Stockholm Conference on the Human Environment, when the world-wide moratorium on commercial whaling was first proposed. In 1978 the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP) initiated preparation of a Global Action Plan for the Conservation, Management and Utilization of Marine Mammals. The plan was endorsed in 1984 by the UNEP Governing Council to serve as a framework for policy planning and programme formulation by the international community. The same year it was endorsed by the IWC and its Scientific Committee.

Harbour or common seals *Phoca vitulina* are fond of basking on the shore for long periods, but their apparent laziness may simply be an adaptation keeping them from the jaws of killer whales and sharks, their major predators.



A basic goal of the plan is to generate a consensus among the governments of the world on which to base a global policy for marine mammal conservation. "Conservation" is taken to include rational exploitation of species and management of human activities which affect them. Although some governments will object, this implies that marine mammals can be exploited as a resource once their populations reach a condition of high productivity. The term embraces "preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment".

The plan involves several other international and non-governmental organizations which will help to carry it out. Action Plan activities are organized into five categories: policy formulation, regulation and protective measures, scientific research, improvement of laws and their application, and public awareness.



Humpback whales are found in all oceans, migrating from cold-water feeding grounds to warm-water breeding areas. In Antarctica they feed on krill and in the Northern Hemisphere on capelin and other fish, bringing them in competition with expanding fisheries in both areas.

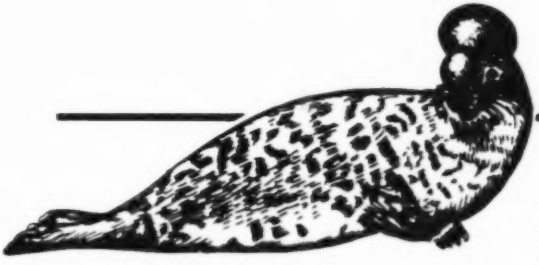
The plan also incorporates 38 recommendations which deal with such subjects as creation of sanctuaries, prohibition of access to breeding areas, the setting of catch limits, a review of fisheries interactions, and evaluation of the effect of scientific sampling on protected stocks. It endeavours to encourage public support for conservation measures in general, and for the Action Plan in particular, and to bring overlapping interests in marine mammal conservation under one roof.

Research projects deal with the harvesting of populations not subject to international control, determination of safe catch limits, conservation-based management of large cetaceans, and assistance to developing countries for the training of marine mammal scientists.

Projects on large cetaceans emphasize stock identification and status evaluation of right, humpback, bowhead and sperm whales in various parts of the ocean, and methods of bringing about their recovery. Small cetacean research will include analysis of stocks and distribution of several species, and a review of the effects of fisheries practices, including incidental capture, on them. Other projects will deal with pinnipeds, sirenians and otters.

The Action Plan is not the last or only hope for marine mammals, but it may be their best hope. For the first time world-wide concern for the fate of these animals is being assembled into a single force, under the auspices of the United Nations. The plan is in urgent need of support from governments, from business and industry, from non-governmental organizations, from grass-roots movements and, perhaps most of all, from individuals. Each of these interests has reason to support marine mammal conservation, whether it comes from a desire to prevent further extinctions of these remarkable animals, or simply the desire to preserve the lucrative industries based on their utilization.

We have found our common ground. It is time to act.



## WHAT CAN YOU DO?

As people around the world become more aware of the plight of marine mammals, they generally want to know two things: where can they get more information about marine mammals, and how can they get involved in activities to protect them from the threats of overexploitation, pollution, habitat destruction and inhumane treatment.

The answer to both questions is the same: find an organization that reflects your own views about how best to protect marine mammals, and join it. Acting alone you will have little impact, whereas groups can collect information, organize activities, mobilize public opinion. An organization will help you to inform yourself about the issues involved in marine mammal conservation, and help you to use your energy to the greatest effect.

A large part of the Global Action Plan will be devoted to generating public awareness. Therefore, UNEP would like to know about organizations around the world which are involved in marine mammal conservation. So, when you locate such an organization, or if you already belong to one, please let us know about it.

Below there is a list of the kinds of information UNEP would like to receive. Once your organization has contacted us, it will become part of our global network of participants in the action plan. You will receive a regular update of the progress of Action Plan activities, and may be eligible to receive partial funding for projects you wish to undertake.

The Global Action Plan is just getting off the ground. To make it a success we need your help, and the help of the organization to which you belong. Let us hear from you.

## *Information requested:*

1. Name of organization
2. Purpose
3. Approximate number of members
4. Address and telephone number
5. Short history of organization's involvement in marine mammal conservation
6. Recent projects and activities
7. Approximate operational buget
8. Scientific affiliation, if any
9. Publications and other material
10. Would your organization be willing to serve as a centre of distribution and communication for the action plan network in your country or region?

Please send this information to:

Director
Oceans and Coastal Areas Programme Activity Centre
United Nations Environment Programme
Palais des Nations
1211 Geneva 10, Switzerland

Killer whales are co-operative subjects for whale watchers.

*Front cover: a female Galapagos sea Lion*
*Back cover:* Walrus Island, Pribilof, Alaska

*This booklet was written, designed and illustrated by Nikki Meith for the United Nations Environment Programme. It does not necessarily reflect the official views of UNEP or of its co-operating agencies.*

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*Key to illustrations: humpback whale (p. 2), Steller's sea cow (p. 3), bottlenose dolphin (p. 4), blue whale (p. 5), Hooker's sea lion, sea otter (p. 10), right whale (p. 12), minke whale (p. 13), elephant seal (p. 14), bowhead whale (p. 17), beluga, narwhal (p. 18), killer whale (p. 19), manatee (p. 22) krill (p. 23), sperm whale (p. 31), northern bottlenose whale, Yangtze dolphin (p. 34), Dall's porpoise (p. 37), common dolphin, hooded seal (p. 38).*

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